No Amendments to the Drawings:

The attached sheets of replacement drawings include Figs. 1-10.

Attachments: 6 Replacement Sheets

REMARKS

Claims 1-26 are pending. In the Office Action dated October 26, 2005, the Examiner took the following action: (1) objected to the specification for informalities; (2) objected to the claims for informalities; (3) rejected claims 1-4, 6-8, 10-12, 17-21 and 23-25 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,875,329 to Washizu et al.; (4) rejected claims 1, 5, 7, 9-10, 13-16, 19, 22 and 26 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,749,736 to Fuhr et al.; (5) rejected claims 1 and 2 under 35 U.S.C. § 101 as claiming the same invention as claim 1 of co-pending Application No. 10/760,139; (6) rejected claims 3 and 4 under 35 U.S.C. § 101 as claiming the same invention as claim 6 of co-pending Application No. 10/760,139; (7) rejected claims 5 and 6 under 35 U.S.C. § 101 as claiming the same invention as claims 7 and 8 of co-pending Application No. 10/760,139; and (8) rejected claims 17 and 18 under 35 U.S.C. § 101 as claiming the same invention as claims 10 and 11 of co-pending Application No. 10/760,139.

The disclosed embodiments of the invention will now be discussed in comparison to the applied references. Of course, the discussion of the disclosed embodiments, and the discussion of the differences between the disclosed embodiments and the subject matter described in the applied references, do not define the scope or interpretation of any of the claims. Instead, such discussed differences merely help the Examiner appreciate important claim distinctions discussed thereafter.

The disclosed invention is a dielectrophoresis device and method that can be used for manipulating particles. The disclosed device and method can use a first electrode at the entrance of a channel through which the particles travel and a second electrode at the exit of the channel. Although additional electrodes may be provided in the channel, only the first and second electrodes are actually required using the disclosed dielectrophoresis device. Even though there can be as few as two electrodes, the field between them can be shaped by the design of the medium in the inter-electrode region. In the disclosed example, deep and shallow regions are used to form an array of insulating ridges, although a single insulating ridge can be used. Because the ridges do not conduct, the current in the fluid passing over the ridges must bend around them. Lines of flow must then expand and contract in passing over each valley and ridge.

The presence of ridges result in field gradients, which cause dielectrophoresis. However, the ridges passively create these field gradients so that there is no need to connect the ridges to ground or energize each ridge. In fact, connecting the ridges to ground or energizing each ridge would be pointless because, as mentioned above, the ridges are insulating and therefore do not conduct current. Also, since the ridges do not conduct current, there is a great deal of freedom in their configuration and fabrication techniques. For example, arrays of these ridges can be inexpensively fabricated in corduroy patterns. The ridges function to shape the field between the first and second electrodes.

The devices shown in the patent to Washizu *et al.* and the patent to Fuhr *et al.* also provide dielectrophoresis, but they do so in a completely different manner. The key to their operation is the use of "electrodes" positioned throughout the devices. Specifically, at each ridge, a conducting material is locally deposited to shape the field. These electrodes are used actively rather than passively as in applicant's disclosed device because each is energized or grounded. The resulting devices must be used at high frequencies because the use of lower frequencies would cause substantial electrolysis, which, in turn, will degrade the performance of the devices. In contrast, since applicant's disclosed ridge is insulating, it cannot conduct electrolysis current, thereby allowing low frequency and even DC to be applied between the first and second electrodes. The use of active conducting electrodes also adversely affects fabrication techniques. In summary, the dielectrophoresis devices shown in the patents to Washizu *et al.* and to Fuhr *et al.* are not only structurally different from applicants' dielectrophoresis device, but they also function differently and operate in a different manner.

Turning, now, to the claims, all of the claims are patentable over the cited references. Claim 1 is directed to a device for manipulating particles using dielectrophoresis. The device includes a substrate and an insulating ridge formed on the substrate, although, of course, an array of ridges may be used. The device also includes a plurality of electrodes positioned to generate a spatially non-uniform electric field across the insulating ridge. As explained above, the electric field created by the electrodes passes over the ridge thereby resulting in field gradients that cause dielectrophoresis. As also explained above, since the ridge is insulating, it passively create these field gradients so that there is no need to connect the ridges to ground or energize each ridge. In contrast, the prior art device use *conductive* ridges to which

electrical energy is applied to actively generate an electric field. Claim 1 is therefore novel over the Washizu *et al.* and to Fuhr *et al.* patents.

Claim 19 is directed to a method for manipulating particles using dielectrophoresis. The method includes generating a spatially non-uniform electric field across an insulating ridge. As explained above, the cited references fail to disclose generating a spatially non-uniform electric field across an *insulating* ridge. Instead, they disclose just the opposite, *i.e.*, generating an electric field across a *conductive* ridge. Claim 19 further specifies passing a sample fluid containing particles across the insulating ridge so that the spatially non-uniform electric field exerts a dielectrophoretic force on the particles. This dielectrophoretic force constrains the motion of at least one particle, which is transporting along the ridge. The cited references do not disclose passing a sample fluid containing particles across an *insulating* ridge to exert a dielectrophoretic force on a particle that transports it along the *insulating* ridge. Therefore, neither the patent to Washizu *et al.* nor the patent to Fuhr *et al.* anticipate claim 19.

The claims dependent on the above-discussed independent claims also patentably distinguish over the cited references because of their dependency on patentable independent claims and because of the additional limitations added by those claims.

The Examiner kindly acknowledged the drawings as filed on October 3, 2003 as accepted. However, applicants would like to bring to the Examiner's attention the replacement figures filed on August 3, 2004. Applicants kindly request acknowledgement of the replacement drawings

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a timely Notice of Allowance are earnestly solicited.

Respectfully submitted,

DORSEY & WHITNEY LLP

Edward W. Bulchis
Registration No. 26,847
Telephone No. (206) 903-8785

EWB:dms
Enclosures:
Postcard
Check
Fee Transmittal Sheet (+copy)
10 Replacement Sheets (Figs. 1-10)

DORSEY & WHITNEY LLP
1420 Fifth Avenue, Suite 3400
Seattle, WA 98101-4010
(206) 903-8800 (telephone)
(206) 903-8820 (fax)
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